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DATE: *August 3, 2006*PTO IDENTIFIER: Application Number 10/566019  
Patent Number

Inventor: Samuel Neto et al.

MESSAGE TO: US Patent and Trademark Office

FAX NUMBER: (571) 273-8300

FROM: CONNOLLY BOVE LODGE &amp; HUTZ LLP

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Attorney Dkt. #: 13111-00032-US

PAGES (Including Cover Sheet): 11CONTENTS: Transmittal of International Preliminary Report on Patentability (1 page)  
International Preliminary Report on Patentability (8 pages)  
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NO. 2571 P. 2/11

AUG 03 2006

Application No. (if known): 10/566019

Attorney Docket No.: 13111-00032-US

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Transmittal of International Preliminary Report on Patentability (1 page)  
International Preliminary Report on Patentability (8 pages)

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AUG. 3. 2006 4:06PM

NO. 2571 P. 3/11

Application No.: 10/566019

Docket No.: 13111-00032-US

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:  
Samuel Neto et al.

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CENTRAL FAX CENTER  
AUG 03 2006

Application No.: 10/566019

Confirmation No.: N/A

Filed: January 25, 2006

Art Unit: N/A

For: MULTI-METAL OXIDE CONTAINING  
SILVER, VANADIUM AND A PROMOTER  
METAL AND USE THEREOF

Examiner: Not Yet Assigned

**TRANSMITTAL OF INTERNATIONAL PRELIMINARY REPORT ON  
PATENTABILITY**

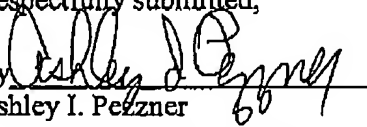
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

Applicant submits herewith the International Preliminary Report On Patentability ("IPRP") issued in the corresponding international application. The international Examiner has deemed that claims 1-8 and 12-18 have novelty, claims 1-8 possess inventive step and claims 1-18 industrial applicability. Each reference cited in the IPRP was cited by Applicant in an Information Disclosure Statement filed by Applicant.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 03-2775, under Order No. 13111-00032-US from which the undersigned is authorized to draw.

Respectfully submitted,

By   
Ashley I. Pezzner

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From the INTERNATIONAL BUREAU

**PCT**

NOTIFICATION OF TRANSMITTAL  
OF COPIES OF TRANSLATION  
OF THIS INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY  
(CHAPTER I OR CHAPTER II  
OF THE PATENT COOPERATION TREATY)  
(PCT Rules 44bis.3(c) and 72.2)

To:

THALHAMMER, Wolfgang  
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Reitstötter, Kinzebach & Part.  
Eing. 28. Juni 2006

Date of mailing (day/month/year)  
22 June 2006 (22.06.2006)

Applicant's or agent's file reference  
M/44053-PCT

International application No.  
PCT/EP2004/008296

International filing date (day/month/year)  
23 July 2004 (23.07.2004)

Applicant

BASF AKTIENGESELLSCHAFT et al

## 1. Transmittal of the translation to the applicant.

- ☐ The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter I).
- ☒ The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter II).

## 2. Transmittal of the copy of the translation to the designated or elected Offices.

The International Bureau notifies the applicant that copies of that translation have been transmitted to the following designated or elected Offices requiring such translation:

KR

The following designated or elected Offices, having waived the requirement for such a transmittal at this time, will receive copies of that translation from the International Bureau only upon their request:

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## 3. Reminder regarding translation into (one of) the official language(s) of the elected Office(s).

The applicant is reminded that, where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability (Chapter II).

It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned within the applicable time limit (Rule 74.1). See Volume II of the PCT Applicant's Guide for further details.

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Translation

## PATENT COOPERATION TREATY

## PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY  
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>M/44053-PCT</b>		FOR FURTHER ACTION		See Form PCT/PLA416
International application No. <b>PCT/EP2004/008296</b>		International filing date (day/month/year) <b>23.07.2004</b>		Priority date (day/month/year) <b>25.07.2003</b>
International Patent Classification (IPC) or national classification and IPC <b>C07C51/265, C07C51/31, B01J23/22, B01J23/50</b>				
Applicant <b>BASF AKTIENGESELLSCHAFT</b>				

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

a. ☒ (sent to the applicant and to the International Bureau) a total of 3 sheets, as follows:

☒ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) \_\_\_\_\_ containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒ Box No. I Basis of the report

☐ Box No. II Priority

☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

☐ Box No. IV Lack of unity of invention

☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

☐ Box No. VI Certain documents cited

☐ Box No. VII Certain defects in the international application

☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IP/EA/EL*	Authorized officer
Facsimile No.	Telephone No.

Form PCT/PLA409 (cover sheet) (January 2004)

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/008296

Box No. 1	Basis of the report
1.	<p>With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.</p> <p><input type="checkbox"/> This report is based on translations from the original language into the following language _____ which is the language of a translation furnished for the purposes of:</p> <p><input type="checkbox"/> international search (Rule 12.3 and 23.1(b))</p> <p><input type="checkbox"/> publication of the international application (Rule 12.4)</p> <p><input type="checkbox"/> international preliminary examination (Rule 55.2 and/or 55.3)</p> <p>2. With regard to the elements of the international application, this report is based on (replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):</p> <p><input type="checkbox"/> the international application as originally filed/furnished</p> <p><input checked="" type="checkbox"/> the description:</p> <p>pages 1-17 _____ as originally filed/furnished</p> <p>pages* _____ received by this Authority on _____</p> <p>pages* _____ received by this Authority on _____</p> <p><input checked="" type="checkbox"/> the claims:</p> <p>nos. _____ as originally filed/furnished</p> <p>nos.* _____ as amended (together with any statement) under Article 19</p> <p>nos.* 1-18 _____ received by this Authority on 11.01.2005 with letter of 05.01.2005</p> <p>nos.* _____ received by this Authority on _____</p> <p><input type="checkbox"/> the drawings:</p> <p>sheets _____ as originally filed/furnished</p> <p>sheets* _____ received by this Authority on _____</p> <p>sheets* _____ received by this Authority on _____</p> <p><input type="checkbox"/> a sequence listing and/or any related table(s) see Supplemental Box Relating to Sequence Listing.</p> <p>3. <input type="checkbox"/> The amendments have resulted in the cancellation of:</p> <p><input type="checkbox"/> the description, pages _____</p> <p><input type="checkbox"/> the claims, nos. _____</p> <p><input type="checkbox"/> the drawings, sheets/figs _____</p> <p><input type="checkbox"/> the sequence listing (specify): _____</p> <p><input type="checkbox"/> any table(s) related to sequence listing (specify): _____</p> <p>4. <input type="checkbox"/> This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).</p> <p><input type="checkbox"/> the description, pages _____</p> <p><input type="checkbox"/> the claims, nos. _____</p> <p><input type="checkbox"/> the drawings, sheets/figs _____</p> <p><input type="checkbox"/> the sequence listing (specify): _____</p> <p><input type="checkbox"/> any table(s) related to sequence listing (specify): _____</p>

\* If item 4 applies, some or all of those sheets may be marked "superceded."

Form PCT/TFE/409 (Box No. 1) (January 2004)

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/008296

Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
<b>1. Statement</b>			
Novelty (N)	Claims	1-8, 12-18	YES
	Claims	9-11	NO
Inventive step (IS)	Claims	1-8	YES
	Claims	12-18	NO
Industrial applicability (IA)	Claims	1-18	YES
	Claims		NO
<b>2. Citations and explanations (Rule 70.7)</b>			
<p>D1: WO 01/85337 A (BASF AG; HIBST HARTMUT (DE); BAUER STEFAN (DE); DIETRICH ULF (DE); BE) 15 November 2001 (2001-11-15)</p> <p>D2: WO 00/27753 A (BASF AG; HIBST HARTMUT (DE); BAUER STEFAN (DE); DIETRICH ULF (DE); HE) 18 May 2000 (2000-05-18)</p> <p>D3: DE 197 05 326 A (BASF AG) 13 August 1998 (1998-08-13)</p> <p>D4: US-A-4 137 259 (VAN GEEM PAUL C ET AL) 30 January 1979 (1979-01-30)</p> <p>D5: HOLLES J H ET AL: "A substrate-versatile catalyst for the selective oxidation of light alkanes - I. Reactivity" JOURNAL OF CATALYSIS, ACADEMIC PRESS, DULUTH, MN, US, vol. 218, no. 1, 19 March 2003 (2003-03-19), pages 42-53, XP004432693 ISSN: 0021-9517</p>			
<p>1. D4 (comparative example C) and D5 (table 11, catalyst Ag<sub>0.4</sub>V<sub>0.4</sub>Ce<sub>0.2</sub>O<sub>3</sub>, paragraph 3.3) disclose catalysts which contain silver, cerium and vanadium, but which either fall outside the stoichiometry of claim 1 (D4: Ag<sub>0.4</sub>V<sub>0.4</sub>Ce<sub>0.2</sub>, c=0.4) or are present with another lattice structure (D5:</p>			

Form PCT/ISA/409 (Box No. V) (January 2004)

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/008296

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability:  
citations and explanations supporting such statement

Ag<sub>1.5</sub>V<sub>0.5</sub> O<sub>3</sub>, monoclinic lattice structure, see XRD in letter of 5 January 2005).

Consequently, the subject matter of claim 1 is novel over D4 and D5 within the meaning of PCT Article 33(2).

2. The present application does not meet the requirements of PCT Article 33(1). The reasons are:

- 2.1 D3 (examples 30, 34, 41, 42, claim 2, table 2 and page 2, line 59) discloses silver- and vanadium-containing shell catalysts for gas-phase oxidation of non-cyclic hydrocarbons. Claim 1 is at least formally novel over D3, since D3 does not disclose XRD data of the precursors of silver vanadium bronzes.

According to D3 (page 3, lines 6-44) the  $\beta$ -phase of silver vanadium bronzes is formed at a stoichiometry of  $\text{Ag}_x\text{V}_{1-x}\text{O}_3$ ,  $x=0.1-0.6$  (Ag:V atomic ratio: 0.05-0.3); the  $\delta$  phase is formed where  $x=0.6-0.9$  (Ag:V atomic ratio: 0.3-0.45). The  $\delta$  phase is also formed at least under reaction conditions in the present application if  $x \sim 0.7$  (see D2: page 25, table 4; present application, catalyst A.1, Ag:V atomic ratio: 0.35).

However, claim 1 of the present application contains a much wider range ( $x \sim 0.1-1.9$ ) such that, under reaction conditions, at least  $\beta$  and/or  $\delta$

Form PCT/PLA/409 (Box No. V) (January 2004)



## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/008296

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability:  
citations and explanations supporting such statement

phases were formed.

According also to claim 9 of the present application (Ag:V atomic ratio: 0.15-0.95),  $\beta$  and/or  $\delta$  phases were formed under reaction conditions. If, therefore, the  $\delta$  phase were as important as the applicant indicates in the letter of 5 January 2005 and were formed from a multi-metal oxide according to claim 1, the Ag:V ratio in both claim 1 and claim 9 of the present application would have to be far narrower.

Consequently, the subject matter of at least claims 1, 6 and 9 does not involve an inventive step within the meaning of PCT Article 33(3), since it contains embodiments which do not solve the problem addressed.

- 2.2 Claim 9 contains no features relating to the diffraction pattern of the catalysts. It states only that the subject matter can be prepared from catalysts according to claims 1 or 6. The stoichiometry according to D3, claim 2 (Ag<sub>0.06</sub> Mo : V<sub>0.94</sub>, for list of substances represented by M, see page 2, line 59, Ag:V atomic ratio: 0.001-1 and M:V ratio 0-0.5) overlaps with that of claims 1 and 9 of the present application. According to D3, claim 4, the use of a  $\delta$ -silver vanadium bronze with an Ag:V atomic ratio of 0.3-0.45 is preferred (claim 4:  $\delta$ -silver vanadium oxide bronze must refer to  $\delta$ -silver vanadium oxide bronze, since the description mentions only  $\delta$ , see also WPI abstract

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## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/008296

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability:  
citations and explanations supporting such statement

of D3).

The catalysts in the examples shown in D3 (examples 30, 34, 41, 42) have the following stoichiometry:  $\text{Ag}_{0.1}\text{Cs}_{0.005}\text{V}_2\text{O}_7$ , wherein Cs is substituted by Ce, Nb, W, Pd or Pt. Even if, according to D3, claim 2, the M:V ratio is 0-0.5, an M:V ratio of 0.005, which falls within the range of claim 9, is used in the examples.

Consequently, the subject matter at least of claim 9 is not novel over D3.

- 2.3 D1 (claims and examples) and D2 (claims and examples) were listed in the description of the present application as prior art, the catalysts in which should be improved. D1 and D2 likewise disclose multi-metal oxide shell catalysts for the oxidation of aromatic hydrocarbons. The essential difference compared with D1 and D2 is that the multi-metal oxide catalysts disclosed therein contain other metals M than Nb, Ce, W, Mn, Ta, Pd, Pt, Ru or Rh or contain no metal M.

The examples according to D1 and D2 disclose only unsubstituted silver vanadium bronzes and the examples in the present application show that the addition of Mn or Ce to unsubstituted silver vanadium bronzes at an Ag:V ratio of ca. 0.35 under conditions under which  $\delta$ -silver vanadium oxide bronzes are formed yields improved conversion with only slight impairment of  $\text{CO}_x$ .

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## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/008296

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

selectivity.

However, claims 1, 6 and 9 cover a much wider range of Ag:V ratios.

Therefore, in light of 2.1 above, inventive step within the meaning of PCT Article 33(3) cannot be acknowledged over the entire range of at least claims 1, 6 and 9.

The same conclusion applies with respect to process claims 12-18 using the catalysts according to claims 6-11.